

Two New Species of Oppiidae (Acari, Oribatida) from South Japan

Tokuko Fujikawa

Ueminami 1346-3, Asagiri-cho, Kumamoto Pref., 〒 868-0423, Japan

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Abstract Two new oppiid species, *Medioxyoppia nagasatoensis* n. sp. and *Ramusella* (*Ramusella*) *kumaensis* n. sp. were collected from Kumamoto Pref., southern Japan.

Key words: *Medioxyoppia* Oppiidae, Oribatida, *Ramusella* (*Ramusella*), South Japan, Two new species.

Two new oppiid species of *Medioxyoppia* and *Ramusella* (*Ramusella*) were collected from Kumamoto Pref., southern Japan. The notations of descriptions and figures in the work are according to Balogh (1983) and Ohkubo (1996). The type series is deposited in the National Museum of Nature and Science, Tokyo.

Medioxyoppia nagasatoensis n. sp.

[Japanese name: Nagasato-tsubudani]

(Fig. 1)

Material examined: Holotype (Female) (NSMT-Ac 12862) from litter, humus and soil material at the garden under no-tillage manner of Nagasato (32° 12' 5" N; 130° 54' 5" E; about 195 m a.s.l.) in Asagiri-cho, Kumamoto Prefecture, May 13, 2007, T. Fujikawa; 1 paratype (NSMT-Ac 12863, female); the same data as holotype.

Etymology: After the local name of sampling area, Nagasato.

Measurements and body appearance: Female (n = 10): Body length, 271 (291) 307 μ m; width: 164 (171) 186 μ m. Body color light-brown. The whole integument smooth, except for the postero-lateral margins of propodosoma densely granulate.

Prodorsum: Propodosoma pentagonal in outline because of triangular rostrum. Rostrum bearing median lobe-like prominence; setae *ro* inserted besides the lobe. Setae *ro* inserted on lateral margins of the prominence extending in front of rostrum. Weakly chitinized wide transverse ridge present between insertions of lamellar (*le*) and interlamellar (*in*) setae. Setae *le* nearer to setae *in* than to setae *ro*. Posterior margin of prodorsum with broadly concave structure medially and two pairs of small structures beside the medial structure. Exceptionally in two specimens, those structures indistinct. All prodorsal setae thin, minutely barbed setiform; rostral

(*ro*) and exobothridial (*ex*) setae minutely pilose; lamellar setae (*le*), interlamellar setae (*in*), and sensilli sparsely barbed unilaterally. Bothridia opening dorsally. Sensilli fusiform, barbed unilaterally. Relative lengths of prodorsal setae and distances between them: $ss > ex > in > ro > le$; $(ro-le) > (in-in) > (le-in) > (le-le) > (ro-ro)$; $(ro-le) / (le-in) \approx 1.8$.

Notogaster: Nearly as long as width. Crista represented by a broad transverse arched band of weakly chitinized behind notogastral setae *c*. Anterior margin of notogaster with small protruding humeral processes. Notogaster bearing ten pairs of setae; all setae thin, sparsely barbed setiform; *p*-series setae shorter than other setae; setae *c* inserted anterior to the transverse band, opposite to bothridia. Notogastral lateral margin with a peripheral ring of light areas of weak chitinization. Lyrifissures *ia* aligned longitudinally postero-laterally to setae *c*; *im* aligned variability transversely or obliquely antero-laterally to setae *lp*; *ip* aligned longitudinally along notogastral outline laterally to setae *h₁*; *ih* transversely-posterolaterally to *lm*; *ips* obliquely postero-laterally to *h₃*. Relative distances between notogastral setae: $(h_3-h_3) > (la-la) > (lm-lm) \approx (lp-lp) > (h_2-h_2) > (c-c) > (h_1-h_1)$.

Ventral region: Genital aperture pentagonal, half as long as interspace between genital and anal apertures (Fig. 1B). Genito-anal setae: 6 1 2 3; setae smooth. Genital setae *g₁*, *g₂* and *g₃* inserted near the mid-ventral line; setae *g₄* and *g₅* near lateral margin of plates; setae *g₆* near posterior margin of plates; *g₅* and *g₆* remote from the remainder. Aggenital setae inserted latero-posteriorly to the genital aperture, somewhat nearer to genital aperture than mid-distance between genital and anal apertures. Lyrifissures *iad* aligned in paraanal position, almost at the level of insertion of anal setae *an₂*. Adanal setae *ad₁* postanal, *ad₂* adanal and *ad₃* preanal; *ad₂* inserted just postero-laterally to *iad*; *ad₃* far removed in front

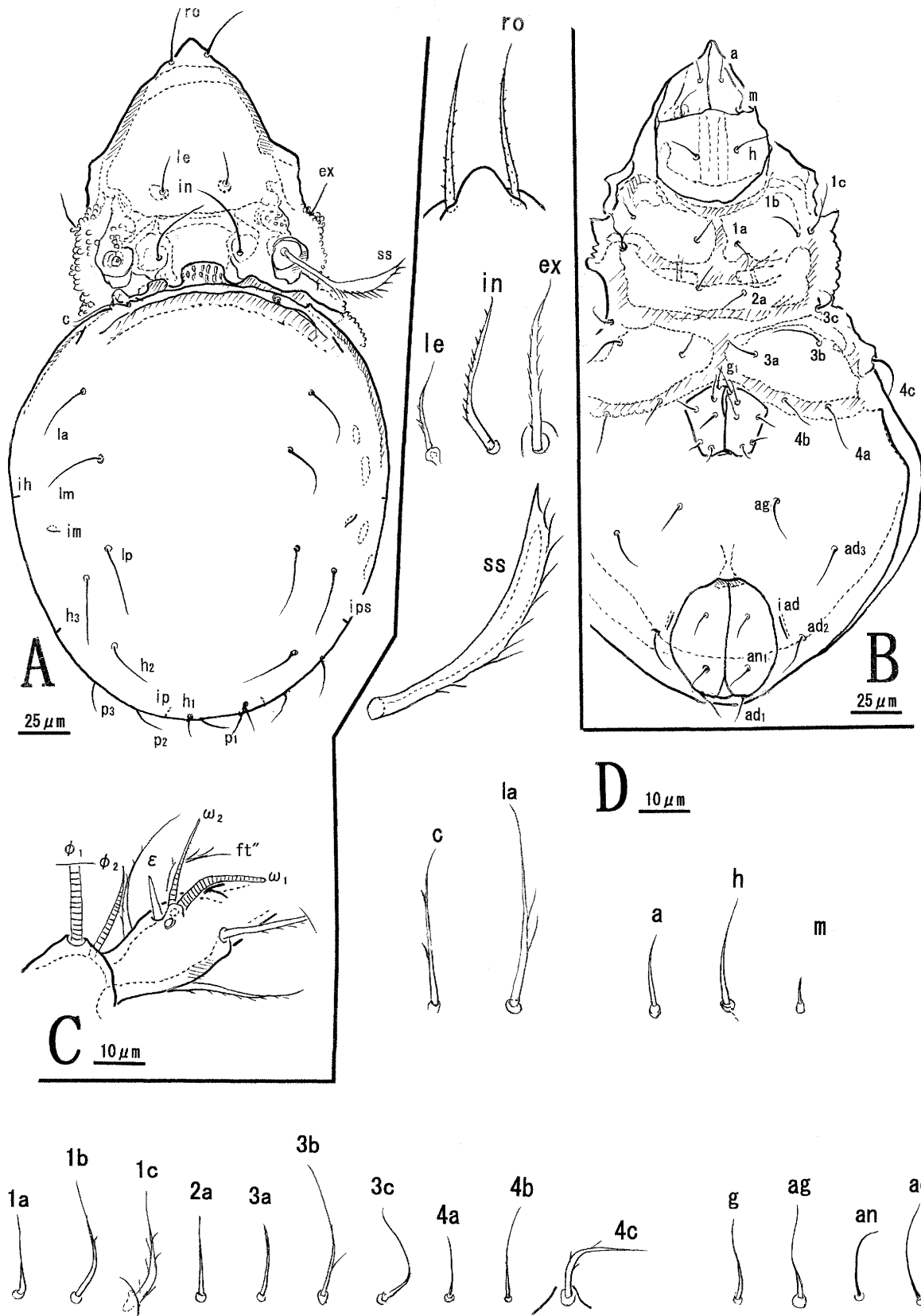


Fig. 1. *Medioxyoppia nagasatoensis* n. sp. (Holotype NSMT-Ac 12862 ♀). A, Dorsal view; B, Ventral view; C, Solenidial region on tarsus I; D, Principal setae.

ro, le, in, ex: Rostral, lamellar, interlamellar, exobothridial setae, respectively; ss: Sensillus; c, la, lm, lp, h_{1-3} , p_{1-3} : Dorsal setae; ih, im, ip, ips, iad: Lyrifissures; g_{1-6} , ag, an_{1-2} , ad_{1-3} : Genital, aggenital, anal and adanal setae, respectively; a, m, h: Anterior, medial and posterior subcapitular setae, respectively; 1a-c, 2a, 3a-c, 4a-c: Epimeral setae; ϵ : Famulus on tarsus of leg I; ω_{1-2} : Solenidia on tarsus of leg I; ϕ_{1-2} : Solenidion on tibia of leg I; ft'': Seta of leg.

of anal aperture. The relative distances: $(ad_3-ad_3) > (ad_2-ad_2) > (ag-ag) > (ad_2-ad_3) > (ad_1-ad_2) \div (ag-ad_3) > (ad_1-ad_1)$. Sternal grooves I and III distinct. Apodemata III lost; other apodemata distinct. Epimeral setal formula: 3-1-3-3; setae *1b*, *1c*, *3b* and *4c* sparsely barbed; others smooth. Diarthric subcapitulum bearing 3 pairs of smooth setae.

Legs: All tarsi monodactyle; claws bearing a few remarkable denticles ventrally. Setal formula of legs including famulus but excluding solenidia: I (1-5-2-4-19), II (1-5-2-4-12), III (2-3-1-3-10), IV (1-2-2-3-10). Solenidiotaxy; I (1-2-2), II (1-1-2), III (1-1-0), IV (0-1-0). Solenidia ω_1 I, ω_2 I and ϕ_2 I short; ω_1 I thick bacilliform; ω_1 I and ω_2 I, arising close together from a small apophysis in front of famulus; ω_1 I slightly longer than ω_2 I; ω_2 I about twice as long as famulus; famulus spiniform.

Remarks: The new species has characters as member of *Medioxyoppia* Subías, 1989 (in Subías & Balogh, 1989) like fusiform sensilli, notogaster with humeral processes, six pairs of genital setae, postanal setae *ad1* and paraanal lyrifissures *iad*. According to Subías (2004) and Fujikawa (2003 [2004]), six species have been known as members of the genus. The new species differs congeners by relative distances among setae *ro*, *le* and *in*: $(ro-le) / (le-in) \div 1.8$, form of sensilli: fusiform barbed unilaterally, length of setae *in*, number of genital setae and presence or absence of transverse ridge on prodorsum.

Key to the species of *Medioxyoppia*

- 1 Five pairs of genital setae 2
- Six pairs of genital setae 4
- 2 Interlamellar setae longer than lamellar setae
..... *M. hamata* Fujikawa, 2003 [2004]
- Interlamellar setae shorter than lamellar setae 3
- 3 Rostrum sharply pointed *M. actirostrata* (Aoki, 1983)
- Rostrum not sharply pointed *M. yuwana* (Aoki, 1983)
- 4 Interlamellar setae longer than lamellar setae ... *M. nagasatoensis* n. sp.
- Interlamellar setae shorter than lamellar setae 5
- 5 Prodorsum with costulae *M. acuta* (Aoki, 1984)
- Prodorsum without costulae 6
- 6 Relative distances $(ro-le) / (le-in) \div 1.1$... *M. mastigohora* (Golosoza, 1970)
- Relative distances $(ro-le) / (le-in) \div 1.6$ *M. nagoyae* Ohkubo, 1991

Ramusella (Ramusella) kumaensis n. sp.

[Japanese name: Kumatsubudani]

(Figs. 2 & 3)

Material examined: Holotype (Female) (NSMT-Ac 12864) from litter, humus and soil material at the garden under no-tillage manner of Nagasato (32° 12' 5" N; 130° 54' 5" E; about 195 m a.s.l.) in Asagiri-cho, Kumamoto Prefecture, Aug. 7, 2007, T. Fujikawa; 1 paratype (Female) (NSMT-Ac 12865): the same data as holotype but May 10, 2007; 1 paratype (Female) (NSMT-Ac 12866): the same data as holotype; 10 paratypes: the same data as holotype but June 22, 2007, Sept. 20, 2007, Oct. 15, 2007 and Jan. 15, 2008; 1 paratype: from litter, humus and soil material at the chestnut plantation (area of about 10 are) of Yamae Mura (32° 14' 57" N; 130° 45' 30" E; about 252 m a.s.l.) in Kumamoto Prefecture, Oct. 25, 2007, S. Hashimoto; 3 paratypes from litter, humus and soil material at the Maruoka square of Yamae Mura (32° 15' 19" N; 130° 45' 31" E; about 284 m a.s.l.) in Kumamoto Prefecture, Oct. 25, 2007, S. Hashimoto.

Measurements and body appearance: Body length, 236-236 μ m; width: 114 (119) 129 μ m. Body color light-yellow. The whole integument smooth, except for the postero-lateral margins of propodosoma densely granulate.

Prodorsum: Rostrum rather truncate; rostral setae (*ro*) geniculate, their alveoli near each other, extending in front of rostrum for a distance equal to half their length.

Proximal part of rostral setae sparsely barbed; distally barbed unilaterally. Lamellar setae (*le*) originate nearer to interlamellar setae (*in*) than to setae *ro*. A pair of indistinct furrows running from the lateral side of insertions of setae *le* to bothridia. Transverse ridge absent anterior nor posterior to setae *le*. Three pairs of sigillae present between setae *in*. Lateral region outside furrows with many light areas of weak chitinisation. Setae *le* and *in* thick, sparsely pilose. Bothridia opening laterally. Sensilli composed of a thin stem and an expanded head bearing pectinations. Exobothridial setae thin, sparsely barbed. Relative lengths of prodorsal setae and distances between them: $ss > ro > in > le > ex$; $(ex-ex) > (ro-le) > (le-in) \div (in-in) > (le-le) > (ro-ro)$.

Notogaster: Elliptical in form, with rounded anterior margin. Nine pairs of setae short barbed; setae *c* absent. Setae *la* situated behind setae *lm*. Notogastral lateral margin with a peripheral ring of light areas of weak chitinization. Lyrifissures *ia* aligned longitudinally at the anterior margin; *im* aligned transversely or somewhat obliquely in front of setae *h3*; *ih* transversely anterior-laterally to *im*; *ip* obliquely

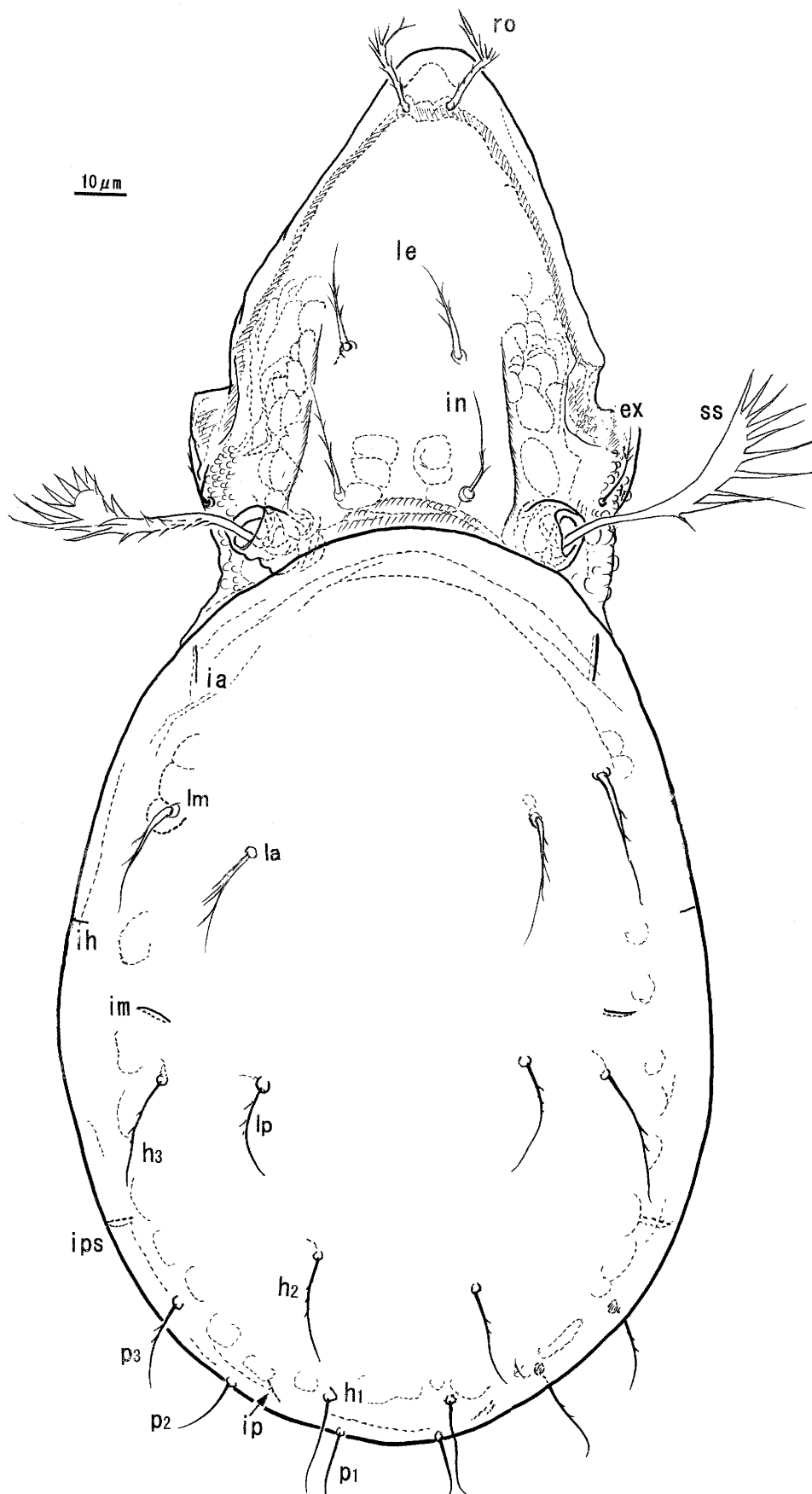


Fig. 2. *Ramusella (Ramusella) kumaensis* n. sp. (Holotype NSMT-Ac 12864 ♀). Dorsal view.

ro, le, in, ex: Rostral, lamellar, interlamellar, exobothridial setae, respectively; ss: Sensillus;
la, lm, lp, h₁₋₃, p₁₋₃: Dorsal setae; ia, im, ip, ips, iad: Lyrifissures

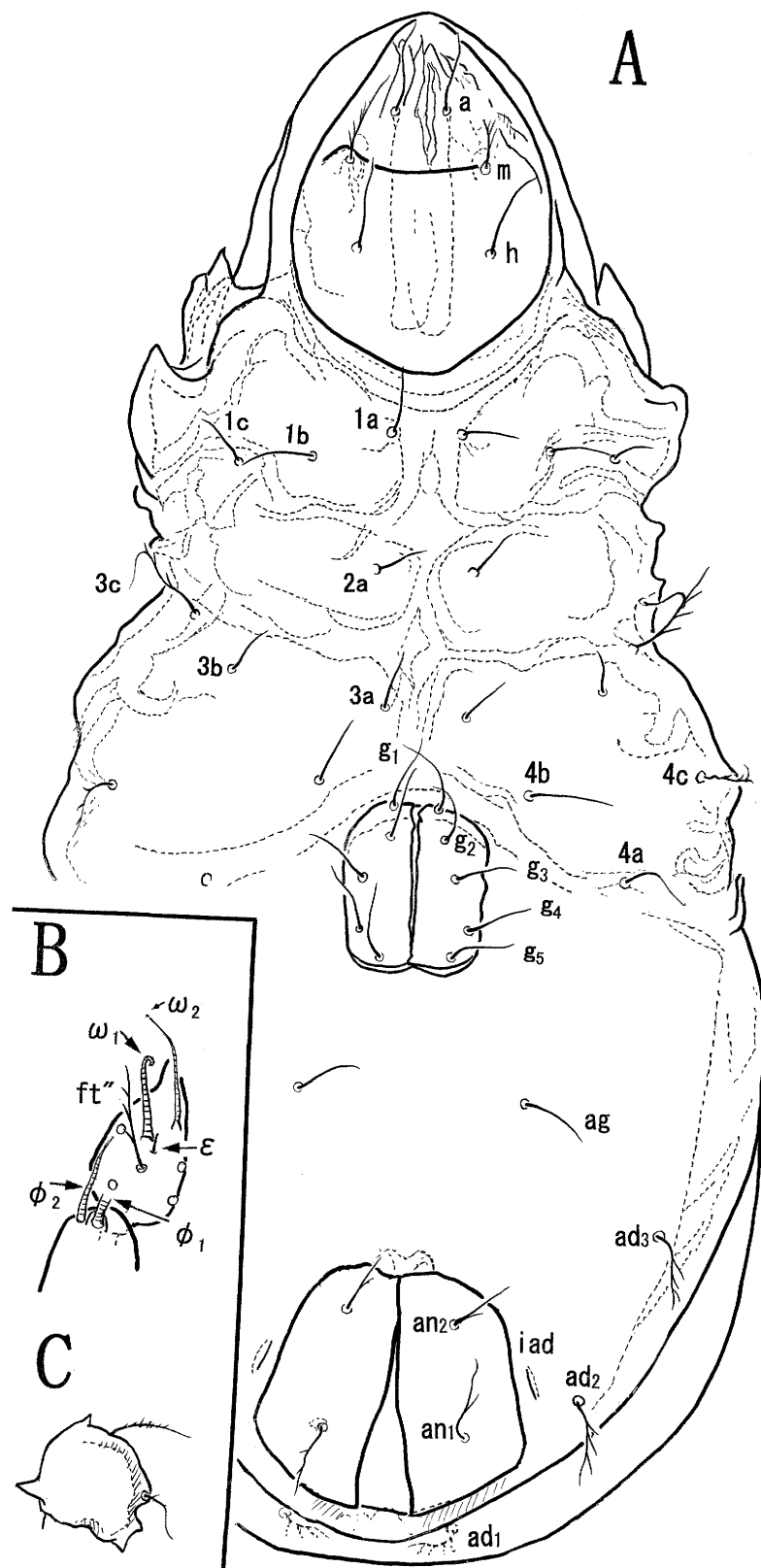


Fig. 3. *Ramusella (Ramusella) kumaensis* n. sp. (Holotype NSMT-Ac 12864 ♀). A. Ventral view, B. Solenidial region on tarsus I; C. Right trochanter III.

iad: Lyrifissures; *g*₁₋₅, *ag*, *an*₁₋₂, *ad*₁₋₃: Genital, aggenital, anal and adanal setae, respectively; *a*, *m*, *h*: Anterior, medial and posterior subcapitular setae, respectively; *1a-c*, *2a*, *3a-c*, *4a-c*: Epimeral setae; *ε*: Famulus on tarsus of leg I; *ω*₁₋₂: Solenidium on tarsus of leg I; *φ*₁₋₂: Solenidium on tibia of leg I; *ft*: Seta of leg.

postero-laterally to setae p_2 ; ips weakly obliqually postero-laterally to h_3 . Relative distances between notogastral setae: $(la-la) > (lp-lp) > (la-lp) > (lp-h_2) > (h_2-h_2)$.

Ventral region: Genital aperture rectangular, about half as long as interspace between genital and anal apertures (Fig. 3A). Genito-anal setae: 5 1 2 3. Genital (g) and aggenital (ag) setae smooth; g_1 and g_2 inserted on inner margin of each plate; g_3 and g_4 near lateral margin of plates; g_5 on posterior margin; ag inserted almost mid-distance between genital and anal apertures. Anal (an) and adanal (ad) setae sparsely barbed unilaterally; adanal setae ad_1 postanal, ad_2 adanal and ad_3 preanal; Lyrifissures iad aligned in paraanal position, at the level of almost mid-distance between setae an_1 and an_2 . Setae ad_2 inserted postero-laterally to iad . The relative distances: $(ad_3-ad_3) > (ad_2-ad_2) > (ag-ag) > (ag-ad_3) \div (ad_2-ad_3) \div (ad_1-ad_2) > (ad_1-ad_1)$. Sternal grooves and apodemata distinct except for lost apodemata III (Fig. 3A). Epimeral setal formula: 3 - 1 - 3 - 3; setae $3c$ and $4c$ sparsely barbed unilaterally; others smooth. Diarthric subcapitulum bearing 3 pairs of setae; a and h smooth; m sparsely barbed unilaterally. Legs: All tarsi monodactyle. Setal formula of legs including famulus but excluding solenidia: I (1 - 5 - 2 - 4 - 20), II (1 - 5 - 2 - 4 - 12), III (2 - 3 - 1 - 3 - 12), IV (1 - 2 - 2 - 3 - 10). Solenidiotaxy; I (1 - 2 - 2), II (1 - 1 - 2), III (1 - 1 - 0), IV (0 - 1 - 0). Famulus on tarsus I minute bacilliform situated postero-laterally to solenidon ω_1 I. Solenidon ω_1 I bacilliform; ω_2 I setiform, longer than ω_1 I, inserted antero-laterally to ω_1 I; seta ft inserted posterior to ω_1 I and postero-laterally famulus. On tibia I, solenidia ϕ_1 I contiguous to ϕ_2 I (Fig. 3B). Trochanter III bearing two small projections (Fig. 3C).

Remarks: The present specimens have main characters of the genus *Ramusella* Hammer, 1962 such as rostral setae knee-bent situated close together, 3 pairs of spots at interlamellar region, 9 pairs of notogastral setae, 5 pairs of genital setae, and paraanal lyrifissures iad . The present specimens are similar to *Oppia tokyoensis* Aoki, 1974 which has been treated as a synonym of *Ramusella* (*Ramusella*) *chulumaniensis sengbuschi* Hammer, 1968 by Subías (1980) and later which is treated as a synonym of *R. (R.) sengbuschi* Hammer, 1968 by Subías (2004). According to the original descriptions, *R. (R.) chulumaniensis* (Hammer, 1958) differs from other congeners by form of lamellar region and rostral setae. *O. tokyoensis* differs from *R. (R.) sengbuschi* by form of rostral setae, relative lengths of lamellar and interlamellar setae, presence or absence of notogastral setae c , and direction of

lyrifissures im . Therefore *O. tokyoensis* should be treated as an independent species as pointed out by Ohkubo et al. (1993). The present species differs from other congeners by absence of transverse ridge in lamellar region, situation of notogastral setae la , form of rostral setae, relative length of lamellar and interlamellar setae, direction of lyrifissures im , and length of genital setae.

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摘 要

藤川徳子 (〒 868-0423 熊本県球磨郡あさぎり町 1346 番地の 3) : ツブダニ科のニ新種.

ナガサトツブダニ (新称) *Medioxyoppia nagasatoensis* n. sp. を熊本県あさぎり町から, クマツブダニ (新称) *Ramusella* (*Ramusella*) *kumaensis* n. sp. を熊本県あさぎり町と山江村から採集し記載した.

References

- Aoki, J.-I., 1974. A new species of oribatid mite found in the middle of Tokyo. *Bulletin of the National Science Museum, Tokyo*, 17: 283-285.
- Aoki, J.-I., 1983. Some new species of Oppiid mites from south Japan (Oribatida: Oppiidae). *International Journal of Acarology*, 9: 165-172.
- Aoki, J.-I., 1984. New and unrecorded oribatid mites from Kanagawa, Central Japan (I). *Bulletin of the Institute of Environmental Science and Technology, Yokohama National University*, 11: 107-118.
- Balogh, J., 1983. A partial revision of the Oppiidae Grandjean, 1954 (Acari: Oribatei). *Acta Zoologica Academiae Scientiarum Hungaricae*, 29: 1-79.
- Fujikawa, T., 2003[2004]. Nineteen new species from the Shirakami-sanchi World Heritage Area, Nippon (Acari: Oribatida). *Acarologia*, 44: 97-131.
- Golosova, L. D., 1970. New species of Oribatids (Acariformes, Oribatei) from the south Primorye and the Kuril Islands. *Zoological Journal*, 49: 694-701.
- Hammer, M., 1958. Investigations on the oribatid fauna of the Andes Mountains I. The Argentine and Bolivia. *Biologiske Skrifter udgivet af Det Kongelige Danske Videnskabernes Selskab*, 10: 1-129.

- Hammer, M., 1962. Investigations on the oribatid fauna of the Andes Mountains III. Chile. *Biologiske Skrifter udgivet af Det Kongelige Danske Videnskabernes Selskab*, 13: 1-96.
- Hammer, M., 1968. Investigations on the oribatid fauna of New Zealand with a comparison between the oribatid fauna of New Zealand and that of the Andes Mountains, South America. *Biologiske Skrifter udgivet af Det Kongelige Danske Videnskabernes Selskab*, 16: 1-96, pls. I-XXXIII.
- Ohkubo, N., 1991. A new species of *Medioxyoppia* Subías (Acari: Oribatei) from Japan. *Acta Arachnologica*, 40: 69-74.
- Ohkubo, N., 1996. Some Oppiid species (Acari: Oribatida) from Chichijima Island in the Bonin Islands, with notes on morphological terms of Oppiidae. *Acarologia*, 37: 229-245.
- Ohkubo, N., Aoki, J.-I., and Hu, S.-h., 1993. Oribatid mites from tropical forests of Yunnan Province in China. III. Family Oppiidae (Part 1). *Journal of The Acarological Society of Japan*, 2: 83-90.
- Subías, L. S., 1980. Oppiidae del complejo *clavipectinata-insculpta* (Acarida, Oribatida). *EOS*, 54: 281-313.
- Subías, L. S. and Balogh, P., 1989. Identification keys to the genera of Oppiidae Grandjean, 1951 (Acari: Oribatei). *Acta Zoologica Hungarica*, 35: 355-412.
- Subías, L. S., 2004. Listado Sistemático, sinonímico y Biogeográfico de los Ácaros Oribátidos (Acariformes, Oribatida) del Mundo (1758-2002). *Graellsia*, 60: 3-305.